Advance Version

COMPLIANCE COMMITTEE

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Report of the individual review of the annual submission of Estonia submitted in 2010

Note by the secretariat

The report of the individual review of the annual submission of Estonia submitted in 2010 was published on 17 March 2011. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2010/EST, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

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Report of the individual review of the annual submission of Estonia submitted in 2010*

* In the symbol for this document, 2010 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2010 annual submission of Estonia, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 13 to 18 September 2010 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Ms. Penelope Reyenga (Australia) and Mr. Klaus Radunsky (Austria); energy – Ms. Maria Lidén (Sweden), Ms. Veronika Ginzburg (Russian Federation), Mr. Ricardo Fernandez (European Union) and Mr. Daniel Tutu Benefoh (Ghana); industrial processes –Mr. Jos Olivier (Netherlands), Mr. Samir Tantawi (Egypt) and Mr. Predrag Novosel (Montenegro); agriculture – Mr. Jacques Bamikole Kouazounde (Benin) and Ms. Rocio Danica Condor (Italy); land use, land-use change and forestry (LULUCF) – Ms. Thelma Krug (Brazil) and Mr. Nijavalli Ravindranath (India); and waste – Mr. Vesligaj Davor (Croatia) and Mr. Juraj Farkas (Slovakia). Ms. Reyenga and Ms. Krug were the lead reviewers. The review was coordinated by Ms. Sevdalina Todorova and Mr. Harald Diaz-Bone (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1), a draft version of this report was communicated to the Government of Estonia, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Emission profiles and trends

3. In 2008, the main greenhouse gas (GHG) in Estonia was carbon dioxide (CO_2), accounting for 85.8 per cent of total GHG emissions[1] expressed in CO_2 eq, followed by methane (CH_4) (8.0 per cent) and nitrous oxide (N_2O) (5.5 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.7 per cent of the overall GHG emissions in the country. The energy sector accounted for 84.3 per cent of total GHG emissions, followed by the agriculture sector (7.1 per cent), the industrial processes sector (5.2 per cent) and the waste sector (3.4 per cent). Emissions from the solvent and other product use sector have been reported as not applicable ("NA") and not estimated ("NE"). Total GHG emissions amounted to 20,271.00 Gg CO_2 eq and decreased by 50.9 per cent between the base year[2] and 2008. The trends for the different gases and sectors seem reasonable, given Estonia's national circumstances and economic development.

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3 of the Kyoto Protocol (KP-LULUCF), by gas and by sector, respectively. In table 1 CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

[1] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from Annex A sources only.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year to 2008[a]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*	*1990*	*1995*	*2000*	*2005*	*2006*	*2007*	*2008*	*Base year–2008 (%)*
Annex A sources		CO_2	36 456.66	36 456.66	18 214.76	15 363.30	16 618.09	16 051.12	19 090.93	17 394.67	–52.3
		CH_4	2 831.05	2 831.05	1 612.68	1 669.43	1 670.32	1 672.23	1 650.47	1 617.52	–42.9
		N_2O	1 984.20	1 984.20	998.07	1 021.36	940.97	962.92	1 040.93	1 125.34	–43.3
		HFCs	25.68	NA, NO	25.68	70.13	118.82	135.66	140.78	132.08	414.4
		PFCs	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.07	0.06	0.04	NA
		SF_6	3.22	NA, NO	3.22	2.73	1.08	1.15	0.97	1.35	–58.1
KP-LULUCF	Article 3.3[b]	CO_2								6 065.98	
		CH_4								NA	
		N_2O								NA	
	Article 3.4[c]	CO_2	NA							NA	NA
		CH_4	NA							NA	NA
		N_2O	NA							NA	NA

Abbreviations: KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation the base year and the inventory years of the commitment period must be reported.

Table 2
Greenhouse gas emissions by sector and activity, base year to 2008

			Gg CO_2 eq								*Change*
		Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2006*	*2007*	*2008*	*Base year–2008 (%)*
Annex A		Energy	36 385.98	36 385.98	18 046.87	15 249.62	16 562.02	15 950.64	18 820.54	17 092.16	–53.0
		Industrial processes	1 075.59	1 046.70	674.42	705.38	807.38	871.74	1 050.31	1 051.61	–2.2
		Solvent and other product use	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA
		Agriculture	3 052.52	3 052.52	1 478.30	1 298.27	1 272.85	1 291.74	1 350.00	1 447.07	–52.6
		Waste	786.72	786.72	654.82	873.68	707.03	709.05	703.29	680.16	–13.5
		Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
		LULUCF	NA	–6 243.13	–7 088.37	–1 452.29	–8 471.27	–8 894.90	–9 440.61	–9 713.80	NA
		Total (with LULUCF)	**NA**	**35 028.78**	**13 766.04**	**16 674.66**	**10 878.01**	**9 928.27**	**12 483.53**	**10 557.20**	**NA**
		Total (without LULUCF)	**41 300.81**	**41 271.91**	**20 854.41**	**18 126.95**	**19 349.28**	**18 823.17**	**21 924.14**	**20 271.00**	**–50.9**
KP-LULUCF	Article 3.3[b]	Afforestation & reforestation								–533.52	
		Deforestation								6 599.51	
		Total (3.3)								**6 065.98**	
	Article 3.4[c]	Forest management								NA	
		Cropland management	NA							NA	NA
		Grazing land management	NA							NA	NA
		Revegetation	NA							NA	NA
		Total (3.4)	**NA**							**NA**	**NA**

Abbreviations: LULUCF = land use, land-use change and forestry, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NE = not estimated.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[c] Elected activities under Article 3, paragraph 4 of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation the base year and the inventory years of the commitment period must be reported.

5. Table 3 provides information on the most important emissions and removals and accounting parameters that will be included in the compilation and accounting database.

Table 3
Information to be included in the compilation and accounting database in t CO_2 equivalent

	As reported	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve	101 267 900		101 355 000	
Annex A emissions for current inventory year				
CO_2	17 383 075		17 394 672	
CH_4	1 611 726		1 617 519	
N_2O	1 125 317		1 125 344	
HFCs	132 078		132 078	
PFCs	38		38	
SF_6	1 350		1 350	
Total Annex A sources	20 253 585		20 271 000	
Activities under Article 3, paragraph 3, for current inventory year				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	–533 521		–533 521	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA		NA	
3.3 Deforestation for current year of commitment period as reported	6 599 505		6 599 505	
Activities under Article 3, paragraph 4, for current inventory year[d]				
3.4 Forest management for current year of commitment period				
3.4 Cropland management for current year of commitment period				
3.4 Cropland management for base year				
3.4 Grazing land management for current year of commitment period				
3.4 Grazing land management for base year				
3.4 Revegetation for current year of commitment period				
3.4 Revegetation in base year				

Abbreviation: NA = not applicable.

[a] "Adjustment" is relevant only for Parties for which the ERT has calculated one or more adjustments.

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3 and elected activities under Article 3, paragraph 4, if any.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2010 annual inventory submission was submitted on 15 April 2010; it contains a complete set of common reporting format (CRF) tables for the period 1990–2008 and a national inventory report (NIR). Estonia also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were also submitted on 15 April 2010. The annual submission was submitted in accordance with decision 15/CMP.1.

7. Estonia officially submitted information and revised emission estimates on 29 October 2010 in response to questions raised by the expert review team (ERT) during the course of the centralized review. Where necessary, the ERT also used submissions from previous years during the review.

8. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.[3]

9. During the review, Estonia provided the ERT with additional information and documents which are not part of the annual submission. The full list of information and documents used during the review is provided in annex I to this report.

Completeness of inventory

10. The inventory covers most source and sink categories for the period 1990–2008 and is complete in terms of years and geographical coverage. However, the ERT noted that Estonia did not report CH_4 emissions from industrial wastewater, CO_2 emissions from limestone and dolomite use for the production of ceramics, or potential emissions of some fluorinated gases (F-gases), categories for which the Intergovernmental Panel on Climate Change (IPCC) provides methodologies in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines). Estonia has also not estimated a number of LULUCF categories and pools (see para. 78) for which reporting is mandatory and methodologies exist in the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). In response to the questions raised by the ERT during the review, Estonia provided estimates for CH_4 emissions from wastewater and CO_2 emissions from ceramic production and indicated to the ERT that it will try to estimate potential emissions in future submissions. In addition, Estonia does not report emissions from some other categories (e.g. under solvents and other product use) for which there are no default IPCC methodologies available, or which are non-mandatory (LULUCF

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5 (a), 6 (c) and 6 (k)), under the auspices of the international transaction log administrator using procedures agreed in the Registry System Administrators Forum. Part I is a completeness check of the submitted information relating to the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and to national registries. Part II contains a substantive assessment of the submitted information and identifies any potential problem regarding information on the accounting of Kyoto Protocol units and the national registry.

categories). The ERT encourages Estonia to report estimates of categories not yet addressed in its next annual submission in order to further improve the completeness and accuracy of its inventory. The ERT also recommends that Estonia, when reporting emissions data for the first time for a given category, ensure that data are provided for the entire inventory time series, and that the choice of methods, emission factors (EFs) and other parameters are clearly explained in the NIR.

2. A description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Overview

11. The ERT concluded that the national system continued to perform its required functions. The ERT also concluded that the overall organization of the national system is effective and reliable from the point of view of the institutional, procedural and legal arrangements for the estimation and timely reporting of GHG emissions. Based upon the Party's responses to questions raised by the ERT, the ERT noted that the national system continues to improve (see para. 14). However, the ERT had some concerns regarding the performance of the national system for the LULUCF sector and KP-LULUCF activities. In response to a question raised by the ERT the Party indicated that it is making changes to the institutional arrangements for the sector for its next annual submission and that relevant inventory data will be provided in the next annual submission.

12. The Party described the changes to the national system since the previous annual submission and these changes are discussed in section II.G.3 of this report.

Inventory planning

13. The NIR and the additional information submitted by Estonia to the ERT described the institutional arrangements for the preparation of the inventory. The Ministry of Environment (MoE) has overall responsibility for the national inventory. Other organizations also involved in the preparation of the inventory are the Estonian Environment Information Centre (EEIC), the Tallinn University of Technology (TUT) and the Estonian Environmental Research Centre (EERC). The MoE has a coordination function and has to approve the inventory before the official submission to the UNFCCC. The EEIC compiles the inventory submission and is responsible for quality assurance/quality control (QA/QC) and archiving. TUT is responsible for the energy and agriculture sectors and the EERC is responsible for the industrial processes and waste sectors. Starting in 2011, the Department of the National Forest Inventory (NFI) of the EEIC (formerly the Centre of Forest Protection and Silviculture) will be responsible for the LULUCF sector and the reporting of activities under Article 3, paragraph 3.

14. During the review, the ERT was informed that Estonia is restructuring its national system by moving the former tasks of the EEIC to a new department of the MoE (the Climate and Radiation Department). Furthermore, Estonia plans to improve efficiency in inventory planning and to facilitate coordination between sectoral experts by contracting an external coordinator for the GHG inventory. The ERT was informed that financial resources for the GHG inventory coordination are available. The ERT welcomes this plan and recommends that Estonia report on its progress in its next annual submission.

15. The ERT welcomes the cooperation of Estonia with other Parties (such as Finland) to strengthen the capacity of the national system. It appreciates Estonia's efforts to enable reporting of activities under Article 3, paragraph 3, of the Kyoto Protocol and of the LULUCF sector, which Estonia had found difficult to achieve in the past. The ERT recommends that Estonia further strive to ensure appropriate reporting of land areas and

conversions in the next annual submission in order to ensure compliance with the reporting requirements under decision 15/CMP.1.

Inventory preparation

Key categories

16. Estonia has reported a key category tier 2 analysis, both level and trend assessment, as part of its 2010 submission for 1990 and 2008 with and without the LULUCF sector. The key category analysis performed by Estonia and that performed by the secretariat[4] produced similar results. The key category analysis was performed in accordance with the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC good practice guidance for LULUCF. The NIR and the comments box in KP-LULUCF table NIR-3 state that the key category analysis for activities under Article 3, paragraph 3 of the Kyoto Protocol has not been provided. However, KP-LULUCF table NIR-3 does provide a key category analysis which identifies CO_2 from all Article 3, paragraph 3 activities as key categories. The ERT recommends that Estonia remove this inconsistency in its next annual submission and report following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory, as provided in chapter 5.4.4 of the IPCC good practice guidance for LULUCF.

17. The ERT reiterates the previous recommendation that Estonia use the results of its key category analysis as a driving force for setting priorities for improving the quality of the inventory.

Uncertainties

18. Estonia has provided a tier 1 uncertainty analysis in its 2010 annual submission including and excluding LULUCF. The estimated uncertainties without LULUCF for total GHG emissions in 2008 and the trend were 7.8 per cent and 4.3 per cent, respectively. With LULUCF the estimated uncertainties for total GHG emissions and the trend were 46.3 per cent and 12.0 per cent, respectively. The uncertainties without LULUCF are similar to those in the 2009 submission, while those with LULUCF are higher than estimated in the 2009 submission (28.7 per cent and 9.6 per cent, respectively). The ERT recommends that Estonia include explanations for such changes in the uncertainty estimates in its next annual submission.

19. The uncertainty analysis is based, to a significant extent, on the default IPCC uncertainties but also on values from a national study[5], data suppliers and from other countries. For F-gases, the estimates are made by experts from Öko-Recherche GmbH, following tier 1 of the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereafter referred to as the 2006 IPCC Guidelines). The ERT noted that the selected uncertainty values are not always well explained or justified. The ERT recommends that

[4] The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the Intergovernmental Panel on Climate Change *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

[5] Eesti Metsad 2008. Metsavarude hinnang statistilisel valikmeetodil. Eesti Metsakorralduskeskus / Adermann, V. (koost). Tallinn, 2009.

Estonia improve the justification of the uncertainty values used in its next annual submission.

20. The ERT noted that the uncertainty analysis for the energy sector has been performed only by fuel group rather than by category and fuel type. As the uncertainties for the same fuels can differ between categories (particularly for non-CO_2 emissions) the ERT recommends that Estonia expand the uncertainty analysis so that it is done by fuel type and CRF category. The ERT also reiterates a recommendation from the previous review report that Estonia update the waste sector uncertainty values, which were considered very low by previous ERTs, and use the results of the uncertainty analysis to prioritize further improvements in the inventory.

Recalculations and time-series consistency

21. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations for the time series 1990–2007 have been undertaken in all sectors to take into account changes/improvements in activity data (AD), EFs and methodologies, to fill data gaps, to improve allocation and to include previously unreported categories for the first time (e.g. emissions from glass production, use of waste fuels and the use of biogas and landfill gas). In many cases the recalculations were based on recommendations from previous ERTs or were corrections of detected mistakes.

22. The total effect of the recalculations for the base year was a 2.6 per cent decrease in total GHG emissions, and an increase in 2007 (0.2 per cent). The rationale for these recalculations is provided in the NIR and in CRF table 8(b) for most of the recalculations. The ERT acknowledges the additional effort made by the Party to summarize the explanations for the recalculations in the NIR in an additional chapter and that recalculations are in general well justified and documented. However, the ERT noted that some of the recalculations are not mentioned specifically (e.g. the recalculation due to a change from COPERT 3 to COPERT 4). The ERT recommends that Estonia further enhance its reporting of recalculations including information on the reasons for the recalculation, justification of the changes made and the impact of the recalculations.

Verification and quality assurance/quality control approaches

23. Estonia has an elaborated QA/QC plan in accordance with the IPCC good practice guidance including tier 1 and some tier 2 category-specific QC procedures. The EEIC is the quality coordinator and the QA/QC procedures are part of the inventory production plan. The QA is performed by an independent expert from TUT and there are also provisions for a public review. The ERT learned from the sectoral sections of the report and from the information provided during the review, that Estonia performed some tier 1 QC activities, mainly related to the cross-checking of AD and a visual inspection of the consistency of trends.

24. The ERT noted the Party's joint project with Finland to improve Estonia's QA/QC plan and encourages Estonia to implement the planned improvements and, in particular, to establish more specific QA/QC procedures for the key categories and to report on the results of the performed tier 2 QC and any QA procedures in the next annual submission. The ERT also recommends that Estonia report on the result of using the European Union emissions trading scheme (EU ETS) data for verification purposes, which is planned for the 2011 submission.

25. The ERT noted some inconsistencies between the NIR and CRF tables (e.g. in agriculture, para. 67), use of incorrect EFs and data entry mistakes (see paras. 41, 50, 61 and 75). The ERT recommends that Estonia enhance its QC procedures for checking both

the CRF tables and the NIR prior to its next annual submission. The ERT also encourages the Party to include information in its next annual submission on training activities or other activities designed to guarantee the necessary capacity of the staff who are responsible for the inventory development process according to Article 12(c) of decision 19/CMP.1. The ERT also recommends that the Party nominate its experts to the roster of experts for the review process, noting that participating in the review process will strengthen the QA/QC capacity of its inventory team.

Transparency

26. Estonia has further improved the transparency of its reporting by using the annotated NIR outline[6]. However, the ERT noted that sometimes the sectoral information is not well allocated between the main body of the NIR and the annexes, and recommends a more integrated presentation of the information, following the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the UNFCCC reporting guidelines). The ERT considers that the transparency of the NIR will benefit from the inclusion of additional information on QA/QC procedures related to data supplied by external sources and improved use of notation keys (see paras. 39, 57 and 101). The ERT recommends that, in future submissions, Estonia include more detailed and comprehensive justifications for the choice of methodologies, EFs, other parameters (e.g. the use of the Finnish EF for wood in households and other sectors (energy sector)) and recalculations. The ERT also reiterates the previous recommendation that Estonia provide explanations for variations of trends (e.g. N_2O emissions from agricultural soils, solid waste disposal on land, waste incineration).

Inventory management

27. Estonia has a centralized archiving system at the EEIC, which includes the archiving of AD, EFs, internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned improvements. The ERT noted that, during the review, Estonia was able to provide all requested documents in a timely manner. However, during the 2009 in-country review the ERT found that the centralized archiving system was not well structured and stored insufficient information on methods, EFs and sources of information and recommended that Estonia improve its centralized archiving system by storing the background data, documentation on methods, EFs, AD and calculation sheets at a central location. During the current review the ERT was informed that the tasks of the EEIC will, in the future, be carried out by a new department of the MoE (Climate and Radiation Department). Estonia expects that this should improve the access to relevant data for the GHG inventory. The ERT recommends that, as part of this restructuring process, Estonia implement the recommendations of the previous ERT with respect to the archiving system.

3. Follow-up to previous reviews

28. The ERT noted that Estonia has addressed issues raised in the previous reviews and followed the recommendations where appropriate or possible. Thus, in response to the recommendations from the previous review, the Party has:

(a) Reported for the first time emissions of various categories (e.g. glass production, emissions from the use of biogas and landfill gas);

[6] <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/pdf/annotated_nir_outline.pdf>.

(b) Provided more detailed explanation/justification for some recalculations in the NIR;

(c) Provided some explanation on the high volatility of AD and emissions data and included further explanations on emission trends for key categories;

(d) Undertaken actions to strengthen its national system (e.g. for the LULUCF sector);

(e) Implemented more country-specific EFs for key categories (e.g. natural gas, motor gasoline);

(f) Addressed inconsistencies between various sectors (energy and waste, energy and industrial processes);

(g) Reallocated various categories in order to improve comparability;

(h) Provided more information on the country-specific EFs and parameters (e.g. oil shale production).

29. However, the ERT concluded that some recommendations made in previous review reports have not been fully implemented, in particular that Estonia:

(a) Provide more detailed explanation/justification for all recalculations in the NIR;

(b) Provide detailed explanations and analysis of the key drivers for the emission trends, by sector and by gas;

(c) Improve the completeness of the inventory;

(d) Ensure time-series consistency and provide sufficient explanation of the fluctuations of the background data, such as data on animal populations;

(e) Move to higher tier methods for key categories;

(f) Use the key category and uncertainty analyses to prioritize improvements in its inventory;

(g) Address inconsistencies between the information provided in the NIR and in the CRF tables.

30. The outstanding category-specific recommendations are reiterated within the relevant sections of this report.

4. Areas for further improvement

Identified by the Party

31. In response to the review process, Estonia has indicated that it intends to create an official working group, including experts from Statistics Estonia in order to improve the consistency and continuous improvement of the GHG inventory. The 2010 NIR identifies planned improvements for each sector, such as: separate reporting of biofuel, improved allocation of fuels within the sector; the development of country-specific EFs for fugitive CH_4 emissions from shale oil production (energy); improve the estimates of F-gases; report the full time series for glass production (industrial processes); improve livestock AD and data on manure management systems (agriculture); update forest land emissions and removals, based on the latest national forest inventory (LULUCF); use country-specific data on waste composition for estimating emissions from solid waste disposal (waste).

32. In its response to questions raised by the ERT, Estonia indicated that it is working to further improve its national system, to provide more estimates based on country-specific

EFs for the inventory submissions for 2011 and 2012 (e.g. in the energy sector) and to further improve the transparency of reporting.

Identified by the expert review team

33. The ERT identifies the following cross-cutting issues for improvement:

(a) Further improve and strengthen the national system, in particular with respect to the LULUCF sector and KP-LULUCF activities, and report on the progress in the next annual submission (para. 15);

(b) Use the key category analysis and uncertainty analyses results as a basis for prioritizing improvements to the national inventory (paras. 17 and 20);

(c) Improve QC checks of the CRF tables and NIR prior to submission (para. 25), report on the implementation of the quality management system and develop more specific QA/QC procedure for key categories (para. 24);

(d) Further improve the transparency related to the explanation/justification of recalculations trends, EFs and parameters, and to the application of the notation keys consistent with the UNFCCC reporting guidelines (para. 26);

(e) Further improve archiving (para. 27).

34. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report.

B. Energy

1. Sector overview

35. The energy sector is the main sector in the GHG inventory of Estonia. In 2008, emissions from the energy sector amounted to 17,092.16 CO_2 eq, or 84.3 per cent of total GHG emissions. Since the base year, emissions have decreased by 53.0 per cent. The key driver for the fall in emissions is the transition from a planned economy to a market economy which resulted in a decline in emissions from the energy industries, manufacturing industries and construction, transport and other sectors. Within the sector, 74.4 per cent of the emissions were from energy industries, followed by 13.6 per cent from transport, 5.8 per cent from manufacturing industries and construction and 3.1 per cent from other sectors. Fugitive emissions from oil and natural gas accounted for 2.9 per cent. The remaining 0.2 per cent were from military use of fuel.

36. Emissions from the energy sector have been reported for all years of the time series and for all geographical locations, and the time series are consistent. The CRF tables include emission estimates for most categories, gases and fuel use from the energy sector, as recommended by the Revised 1996 IPCC Guidelines. Estonia has not used the notation key "NE" in the CRF tables.

37. The methodologies used in the sector are in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance with a few exceptions, such as the methodology used for the reference approach. Emissions from stationary combustion are estimated using the tier 1 methodology for imported fuels. For domestic fuels, which accounts for most emissions, tier 2 and tier 3 methods are used. For road transportation, which accounts for most of the emissions from mobile combustion, CO_2 emissions are estimated using tier 1 and CH_4 and N_2O are estimated using tier 3 (COPERT 4 model). Such prioritizing is in accordance with the IPCC good practice guidance. The ERT encourages Estonia to continue its work on moving to higher tiers and country-specific EFs for key categories.

38. The NIR is not sufficiently transparent in terms of the driving forces behind the trends in emissions and implied emission factors (IEFs) for all subcategories within the category other sectors. In response to a question from the ERT, Estonia explained that the IEF trends are due to changes in the contribution of different solid and liquid fuels over time. The ERT recommends that Estonia include such information for all categories in the NIR of its next annual submission.

39. The ERT also noted that the notation keys have not been used consistently for all categories in the energy sector; for example, CO_2 emissions from other fuels from non-ferrous metals have been reported as "NA", whereas the AD have been reported as "NO". There are also several incorrect notation keys in the reference approach. The ERT recommends that Estonia review its use of the notation keys in all CRF tables in its next annual submission in order to ensure that all notation keys are accurate and consistently used.

40. Recalculations have been performed for all years and all categories in the sector. Some of the recalculations are due to the replacement of the default EFs by EFs from a neighbouring country for imported fuels (e.g. gasoline from Lithuania). Other reasons for recalculations were the updating of AD, methodological changes (e.g. domestic aviation) and the reallocation of emissions (e.g. CO_2 emissions from shale oil production were reallocated from petroleum refining to manufacture of solid fuels and other energy industries, and emissions from agricultural off-road transportation were reallocated from other transportation to agriculture/forestry/fishing). As a result, emissions in the energy sector have decreased by 3.2 per cent and 0.6 per cent in 1990 and 2007, respectively. The ERT commends Estonia for the efforts to improve its estimates and to document and justify them in the CRF and NIR. However, the ERT noted that the Party has not always justified and well-documented the recalculations. For example, the recalculation of CH_4 and N_2O emissions using COPERT 4 was not mentioned under the recalculation section in the NIR. The ERT recommends that Estonia further improve the documentation of its recalculations in the NIR and CRF table 8(b).

41. The ERT identified a number of errors in reporting due to data entry mistakes (e.g. CO_2 emissions from residential combustion, CH_4 and N_2O emissions from liquid fuels in the chemical industry, CH_4 EF for natural gas in stationary combustion). The ERT recommends that Estonian improve the QC checks on the NIR and CRF tables for its next annual submission. In response to the questions raised by the ERT and to correct the data entry mistakes listed above, Estonia provided revised estimates for the sector for all years. As a result of this, emissions from the sector in 2008 increased by 1.35 Gg CO_2 eq.

42. In the previous review report, there were a number of recommendations linked to lack of transparency, incompleteness, improper emission allocations, use of incorrect EFs, and the application of tier 1 for key categories. The ERT noted that Estonia has implemented many of the recommendations. The reporting has improved significantly since the last submission, including the reallocation of CO_2 emissions from shale oil production from petroleum refining to manufacture of solid fuels and other energy industries, the correction of AD for oil shale and the reallocation of oil shale gas from gaseous fuels to solid fuels. The trends for energy industries and manufacturing industries and construction are explained in the NIR, which also provides detailed information on estimates and methodologies for the major domestic fuels (oil shale, shale oil and oil shale gas). The ERT commends Estonia for all these improvements. The ERT also commends Estonia for replacing the IPCC default EFs with more specific EFs for many key categories (e.g. CO_2 emissions from combustion of gasoline, gas oil, peat, waste oil, municipal solid waste and plastic waste). The ERT welcomes the planned project on country-specific EFs in 2011, the results of which will be implemented in the 2012 submission, and encourages Estonia to continue its work and report on the progress in the next annual submission.

Recommendations that are outstanding from the previous review report are reiterated in the relevant category-specific sections of this report.

2. Reference and sectoral approaches

Comparison of the reference approach with the sectoral approach and international statistics

43. The difference in the estimate of CO_2 emissions calculated using the reference and sectoral approaches is 1.54 per cent in 2008. The difference is larger at the beginning of the time series. The NIR includes brief explanations on the comparison. The difference is mainly attributed to the fact that a lot of secondary fuels are used in the sectoral approach.

44. The ERT noted that Estonia reported fuel consumption in CRF table 1.A(b) after subtracting fuels used for industrial processes and other non-energy purposes, such as road paving and lubricating. This is not in line with the Revised 1996 IPCC Guidelines, which requires all fuel used within the country to be accounted for in reference approach table 1.A(b) regardless of sector. Fuels used for non-energy purposes (e.g. for road paving, fugitive emissions and industrial processes) should be reported in table 1.A(d) and the values for carbon stored in non-energy use of fuels from table 1.A(d) should be reported in table 1.A(b) in the column "carbon stored" for each fuel type. For better comparison of energy consumption between the approaches there is a specific column for "Apparent energy consumption (excluding non-energy use and feedstocks)" in table 1.A(c) where only fuels used in the energy sector should be included. The ERT recommends that Estonia revise its reporting of the reference approach to ensure that all fuel is accounted for correctly for all years and report corrected tables in its next annual submission.

45. The information in the NIR on net calorific values and carbon EFs for jet kerosene is different from the values reported in CRF table 1.A(b). The ERT recommends that Estonia re-examine its use of net calorific values and carbon EFs in the reference approach and ensure that the information given in the CRF tables and in the NIR is accurate, consistent, complete and transparent in its next annual submission.

46. Apparent consumption in Estonia's reference approach for 1990–2008, as reported in the CRF tables, shows discrepancies with the International Energy Agency (IEA) data (with discrepancies within 7 per cent), and a similar growth rate, except for international bunkers fuels where there are major differences. Information provided by Estonia during the review process shows that the data provided to the IEA were updated in November 2009. The ERT recommends that the Party include comparisons with IEA data as part of the QC checks.

International bunker fuels

47. As noted by the previous ERT, the Party's NIR does not include the methodology used to distinguish between domestic and international fuel use. The only explanation given in the NIR is that AD from Statistics Estonia were used. During the review of the 2009 submission, Estonia explained that the sample survey carried out annually by Statistics Estonia specifically requests respondents to distinguish between fuel that is used for domestic and international purposes. The ERT reiterates the recommendation that Estonia elaborate on this explanation in its next annual submission.

Feedstocks and non-energy use of fuels

48. As noted in the previous review report, carbon storage from peat has been reported in table 1.A(b), but it has not been included under feedstocks in table 1.A(d). Oil shale has been reported as feedstock only in table 1.A(d). The ERT reiterates the recommendation of the previous review report that Estonia reconsider its reporting of peat and oil shale as a

feedstock and, if appropriate, revise the values in its next annual submission. The ERT also recommends that, in its next annual submission, Estonia provide transparent documentation in the NIR on how non-energy use of fuels is reported.

3. Key categories

Stationary combustion: biomass – CH_4 and N_2O

49. Estonia reports emissions of CH_4 and N_2O from the combustion of wood in households and agriculture, using the IPCC methodology. However, Estonia uses EFs from Finland without justifying its choice. During the review, Estonia informed the ERT that, since 1993, numerous programmes have been implemented in Estonia to modernize the combustion technique, often converting to Finnish boilers. The ERT recommends that Estonia include this information in the NIR of its next annual submission.

4. Non-key categories

Stationary combustion: gaseous fuels – CH_4 and N_2O

50. In the previous review report, it was noted that CH_4 and N_2O emissions from oil shale gas (then reported as gaseous fuels) were reported as "NE". In this submission emissions are estimated and correctly reallocated as solid fuels. The ERT noted that the CH_4 emissions from combustion of natural gas in non-ferrous metal industries were underestimated because of the use of the incorrect EF (0.1 kg CH_4/TJ). During the review, Estonia provided the ERT with the correct information for the EF (1 kg CH_4/TJ) and also submitted corrected estimates of CH_4 emissions from natural gas for the entire time series. In addition, the ERT noted that EFs for CH_4 and N_2O from combustion of natural gas are incorrect in the NIR. The ERT recommends that Estonia correct this information in its next annual submission.

Stationary combustion: solid fuels – CH_4 and N_2O

51. Emissions of CH_4 and N_2O from the combustion of oil shale are reported to be zero, with insufficient justification provided in the NIR. During the review, Estonia provided the ERT with detailed information to support its choice of the zero CH_4 EF and informed the ERT that, according to recent measurements, emissions of N_2O do occur and an EF had been developed for fluidized bed combustion technology (0.82 kg/TJ) and that this had been used in the estimates for relevant years (2004 and later years). The ERT recommends that Estonia include the background information on the CH_4 and N_2O EFs in its next annual submission.

Navigation: liquid fuels – CO_2, CH_4 and N_2O

52. Emissions from deep sea fishing were not included in the reporting for national navigation. During the review, Estonia informed the ERT that deep sea fishing vessels buy their fuel abroad. Therefore, the emissions are reported as international bunkers for the neighbouring Parties. The ERT recommends that Estonia include this information in the NIR in its next annual submission.

Fugitive emissions from solid fuels: coal mining and handling – CH_4

53. Estonia reports no CH_4 emissions from surface mining of oil shale as the EF is set to zero. However, in the NIR the explanation for this EF is not transparent. Previous ERTs recommended that Estonia prove the non-occurrence of CH_4 emissions or estimate the emissions. The ERT reiterates this recommendation and recommends that Estonia provide

transparent documentation for the EF used, for instance a short summary of the study used as a reference, in its next annual submission.

C. Industrial processes and solvent and other product use

1. Sector overview

54. In 2008, emissions from the industrial processes sector amounted to 1,051.61 Gg CO_2 eq, or 5.2 per cent of total GHG emissions. Since the base year, the emissions have decreased by 2.2 per cent in the industrial processes sector. The key driver for the decrease is the chemical industry. Within the industrial processes sector, 61.6 per cent of emissions were from mineral products, followed by 25.7 per cent from chemical industry and 12.7 per cent from consumption of halocarbons and SF_6. Emissions from the solvent and other product use sector have been reported as "NA" and "NE".

55. The inventory was generally complete. CO_2 emissions from glass production were reported for the first time in the 2010 submission. Emissions of CO_2 from limestone and dolomite use for ceramic production were reported as "NE"; however, during the review the Party submitted estimates for this category. Emissions from the solvents and other product use sector, in particular CO_2 and N_2O, are reported as "NE", but Estonia informed the ERT that it is planning to report emissions from that sector for the first time in its 2011 submission.

56. Although the energy balance for Estonia reports on the non-energy use of lubricants and paraffin waxes, consistent with the IEA statistics, Estonia does not report these uses in the CRF table 1.A(d) on feedstock/non-energy use, nor does it report CO_2 emissions from their use in the industrial processes sector or in the energy or waste sectors. The ERT encourages Estonia to estimate the CO_2 emissions for the use and disposal of lubricants and paraffin waxes and report them in the appropriate sector in the next annual submission.

57. Estonia reports potential emissions of HFCs, PFCs and SF_6 as "NO" for cases where it reports actual emissions in one or more subcategories under consumption of halocarbons and SF_6. The ERT recommends that Estonia change the notation key in these cases to "NE" and encourages Estonia to provide estimates of potential emissions for these gases.

58. Estonia is commended for improving the transparency of the NIR and for the notable improvements to the emission estimates resulting from the recalculations of CO_2 emissions from production of cement, lime, glass and ammonia, HFC emissions from refrigeration and SF_6 from electrical equipment, which were done in response to the recommendations of previous ERTs and were due to improved plant-specific AD and EFs and methods (cement, ammonia). These recalculations resulted in a 9.1 per cent increase in base year emissions and a 15.0 per cent increase in emissions for 2007. The revised estimates submitted by the Party during the review added 10.73 Gg CO_2 eq (or 1.0 per cent) to the total emissions from the sector in 2008.

59. Estonia fully implemented the recommendations of the previous ERT, except for those relating to using EU ETS data for category-specific verification, a satisfactory explanation is still missing for the cement kiln dust (CKD) factors for the period before 2004 (para. 60), and estimating CO_2 from limestone and dolomite use (para. 63).

2. Key categories

Cement production – CO_2

60. Estonia has recalculated CO_2 emissions from cement production, applying the tier 2 method from the IPCC good practice guidance. The ERT commends the Party for this

improvement and for providing information on the underlying EF and CKD factor values. However, the ERT concluded that the information provided in the NIR is insufficient to explain how all parameter values were determined, and in particular to justify the high CKD values for the years before 2004. The ERT reiterates the recommendation of the previous ERT for further enhancement of transparency of the reporting for this category and recommends that Estonia provide a more detailed methodological description, in particular of how the CKD values were determined for 1990–2004, and include in its next annual submission the information on this matter which it had provided during the current review.

Ammonia production – CO_2

61. Estonia uses natural gas as feedstock for ammonia production and applies methods consistent with the IPCC good practice guidance (tier 1a). Following the recommendation of the previous review report, Estonia has recalculated emissions from the category, which now also include CO_2 emissions from ammonia production used for urea production or sold (previously not included). This increased the CO_2 emissions in 2007 by 135.56 Gg (or 108.9 per cent). The ERT found that the data for natural gas consumption as feedstock in ammonia production reported in Annex 11 of the NIR and in CRF table 1.A(d) correspond well with each other, except for the years 1991, 2001 and 2003. During the review, Estonia clarified that the discrepancy in 2001 is due to a data entry mistake in table 1.A(d). The ERT recommends that Estonia recheck the values and, where applicable, correct the CRF table for the next annual submission.

Consumption of halocarbons and SF_6 – HFCs

62. Emissions from the use of F-gases were calculated using tier 2a and 3 methods according to the 2006 IPCC Guidelines and mainly country-specific EFs. The ERT welcomes this approach; however, it notes that the EF (product life factor (PLF)) of 2 per cent for household refrigeration is very high compared with the default IPCC range of 0.1–0.5 per cent and country-specific values reported by other countries (mostly between 0.01 per cent and 0.5 per cent). The ERT recommends that Estonia review the leakage rate of these refrigerators and further justify its use of the EF or apply a default PLF value or a revised country-specific PLF and recalculate the emissions, as applicable. To improve transparency, the ERT also recommends that Estonia include in the NIR more information about the development of the PLF for commercial refrigeration and for different types of vehicles that have mobile air conditioning. Estonia could use some of the information provided during the review for this purpose.

3. Non-key categories

Limestone and dolomite use – CO_2

63. Estonia reports "NE" for CO_2 emissions from limestone and dolomite use in the CRF table 2(I)A-G. In the NIR, it was indicated that limestone and dolomite are used for ceramics production (e.g. bricks and roof tiles). During the review, Estonia estimated and resubmitted estimates for CO_2 emissions from the production of ceramics (bricks and tiles) and of lightweight gravel for the entire time series and information on the data and methodology applied. The emissions were calculated using the methodology and EFs consistent with the IPCC good practice guidance. The ERT recommends that Estonia include details on the methods and AD used to estimate the emissions in its next annual submission.

D. Agriculture

1. Sector overview

64. In 2008, emissions from the agriculture sector amounted to 1,447.07 Gg CO_2 eq, or 7.1 per cent of total GHG emissions. Since 1990, emissions have decreased by 52.6 per cent. The key driver for the fall in emissions is the decline in the livestock population and the quantities of synthetic fertilizers and manure applied to agricultural fields. Within the sector, 56.6 per cent of the emissions were from agricultural soils, followed by 30.5 per cent from enteric fermentation, 12.5 per cent from manure management and 0.4 per cent from field burning of agricultural residues.

65. The inventory is complete in terms of categories and gases with estimates reported for all years in the time series. Estonia reported that rice cultivation and prescribed burning of savannas do not occur in the country. In response to recommendations in the previous review report, Estonia estimated emissions from field burning of maize, mixed grain, triticale and dry bean residues. The Party has also included enteric fermentation and manure management emission estimates for fur-bearing animals using the EF developed by Norway.

66. The agriculture section of the NIR is generally transparent. In response to previous recommendations, an explanation for the fluctuation in AD for agricultural soils has been provided. However, the ERT recommends that Estonia further enhance transparency by including more information in the NIR on the enhanced livestock characterization used and on the source of the methane conversion factor (MCF) for cattle manure in the "liquid/slurry solid" manure management system or burned for fuel and for pig manure in pit management systems. Transparency would be further enhanced by the inclusion of cross-references to the appropriate sections of the NIR in the CRF table documentation boxes.

67. The ERT notes that the references to data sources reported in the NIR are sometimes wrong, not provided or incomplete. For example, the reference to table 4-7 of the Reference Manual instead of table 4-21 of the Revised 1996 IPCC Guidelines as the source of the default percentage of manure production per animal waste management system, and the method for non-dairy cattle is reported in the NIR as tier 1 instead of tier 2. The ERT recommends that Estonia improve QC checks on the NIR and CRF tables for the next annual submission.

68. Recalculations have been carried out for the entire time series in enteric fermentation, manure management, and agricultural soils because the weight of mature dairy cattle was revised and emissions from fur-bearing animals were estimated for the first time. Recalculations of field burning of agricultural residues and direct soil emissions were performed as a result of updates to the quantities of crops burned and sewage sludge applied on agricultural soils, respectively. The explanations are provided in both CRF table 8(b) and in the NIR. The recalculations resulted in a 0.7 per cent reduction in the total emissions from the sector for 1990 and a 1.3 per cent increase in the total emissions for 2007.

69. Estonia has made efforts to address the recommendations of the previous ERT (e.g. country-specific data on the mature dairy cattle weights have been included in the NIR, better information on the AD fluctuations included). The NIR also indicates that Estonia plans to use country-specific manure management system information in the next annual submission. The ERT encourages this development and recommends that the Party include the country-specific information and ensure it is applied consistently for all manure management calculations.

2. Key categories

Enteric fermentation – CH_4

70. Estonia used tier 1 methods for all animals except cattle and swine, for which a tier 2 enhanced livestock characterization is used. The NIR does not provide sufficient information on the characterization used for non-dairy cattle. The ERT noted from the CRF tables that, for a number of parameters, the Western Europe defaults have been used rather than those for Eastern Europe. The ERT recommends that the Party include disaggregated information (e.g. values and data sources for weight and CH_4 conversion factors) and justifications for the use of Western Europe defaults in the NIR to improve the transparency of reporting.

71. In the CRF tables, Estonia reports only calves under the young cattle subcategory, with bovine cattle (aged 1 to 2) reported in the mature animal subcategory. The ERT also noted that the calves where not excluded from the enteric fermentation calculations for the period when they are milk-fed. The ERT recommends that Estonia report bovine cattle in the young cattle subcategory, because they are growing animals, and apply a CH_4 conversion rate of zero to calves for the period when they are milk-fed.

72. Emissions for dairy cattle are estimated using a combination of the equations and default data from the Revised 1996 IPCC Guidelines and the IPCC good practice guidance and country-specific data. Since there are some differences in the equations (e.g. for energy for growth and energy for pregnancy) between these guidance documents, the ERT recommends that Estonia only use, in addition to country-specific data, the equations and default data from the IPCC good practice guidance.

73. Estonia included, for the first time, estimates for emissions from fur-bearing animals using the Norwegian EF (0.1 kg/animal/year). The EF was derived by scaling the EF for swine, based on a comparison between the average weights of swine and fur-bearing animals, because swine are assumed to be similar to fur-bearing animals with regard to digestive system and feeding. The ERT encourages Estonia to examine the possibility of developing country-specific EFs for fur-bearing animals by scaling the Estonia-specific EF for swine.

Manure management – N_2O, CH_4[7]

74. The ERT notes that, for swine and young non-dairy cattle, different manure management system allocations have been used for the estimation of CH_4 and N_2O emissions. The ERT acknowledges that there is an inconsistency in the default allocations reported in appendix B table B-4 and table 4.21 of the Revised 1996 IPCC Guidelines reference manual. As the allocations selected can result in significantly different emissions, the ERT recommends that Estonia select the most appropriate allocation for its national circumstances and use this allocation consistently for the estimate of CH_4 and N_2O emission from manure management.

Agricultural soils – N_2O

75. A mix of tier 1a and tier 1b methods is used for the estimation of N_2O from agriculture soils. For the estimation of direct emissions from agricultural soils, the amount of nitrogen (N) input from manure applied to soils has been incorrectly calculated. The amount of N applied (and reported in CRF table 4.D) should be the N excreted adjusted for the N that has already been lost as N_2O, NH_3 and NO_X. The ERT also noted that, in CRF

[7] Methane emissions under this category are not a key category. However, since issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

table 4.D, Estonia reports the incorrect fraction of livestock N excreted and deposited onto soil during grazing (0.2). As Estonia uses the IPCC default allocations for each animal class, the value reported in CRF table 4.D should be calculated as the ratio of manure from grazing animals and the total of manure from all animals (i.e. 0.17). The ERT strongly recommends that Estonia correct these errors in its next annual submission.

76. For calculating N in crops residue returned to soils, Estonia used the default residue nitrogen values (0.03). However, the ERT notes that for field burning of agricultural residues Estonia provided detailed crop data which could be used to calculate crop residue N using the enhanced tier 1b method described in equation 4.29 of the IPCC good practice guidance. The ERT encourages Estonia to calculate the N content of crop residues consistent with the data used for estimating emissions from the burning of crop residues in the next annual submission.

E. Land use, land-use change and forestry

1. Sector overview

77. In 2008, net removals from the LULUCF sector amounted to 9,713.80 Gg CO_2 eq. Since 1990, net removals have increased by 55.6 per cent. The key drivers for the rise in removals are the increase in the area of forest land due to abandonment of grassland areas and overgrowing of wetlands. Within the sector, removals of 8,665.53 Gg CO_2 eq (89.2 per cent of total removals) originated from forest land (forest land remaining forest land), followed by 1,560.79 Gg CO_2 eq (16.0 per cent) from grassland (grassland remaining grassland) and 13.88 Gg CO_2 eq from wetlands. Cropland (cropland remaining cropland) contributes to net emissions of 526.40 Gg CO_2 eq.

78. The LULUCF sector of the inventory is not complete, with emissions/removals for many subcategories and pools reported as "NE" and with incomplete time series provided for some. Regarding the subcategories, Estonia does not estimate emissions/removals from any land converted to other land-use categories except cropland converted to grassland, for which only emissions from mineral soils are reported. For the subcategories that are reported, the following pools are "NE": dead organic matter for forest land, cropland and grassland; mineral soils for cropland and grassland; and biomass for grassland. A complete time series was only provided for cropland converted to grassland. A time series of CO_2 emissions from lime application on agricultural soils was included for the first time in the 2010 submission, but the ERT notes that emissions are only estimated for the application of lime to cropland and not for the application of lime to grassland. The ERT strongly recommends that Estonia improve the completeness of the LULUCF estimates.

79. Estonia uses approach 1 for land-use representation and makes use of supplementary data to estimate inter-category changes. When using this approach, it is good practice to establish the relationship between definitions of the broad land-use categories in use, particularly forests. It is challenging to estimate land-use conversions from this basic land-use data approach, and this may explain the incompleteness in reporting for all land conversions. The ERT encourages Estonia to improve its AD and to implement approach 2 or 3 for land representation. This will increase the transparency of the reporting and ensure consistency and accuracy of the time series.

80. For the LULUCF subcategories reported, Estonia in general applies tier 1 methods, using country-specific AD and default EFs and parameters from the IPCC good practice guidance for LULUCF. The ERT recommends that Estonia develop country-specific EFs and parameters where possible. In relation to the AD, the ERT noted that Estonia uses the forest area reported to the Food and Agriculture Organization of the United Nations (FAO) in the CRF table 5.A, but data from the Estonia Statistical Office (ESO) are also provided

in the NIR. The forest land areas differ between these data sources and Estonia does not provide a clear explanation of the adequacy of any of these sources for use in its inventory. The ERT strongly recommends that Estonia harmonize these different sources, or explain the rationale for the selection of the dataset used in the inventory.

81. The reporting on the LULUCF sector is generally transparent and has improved since the last review. Estonia included transparent descriptions of the methods and EFs used to estimate emissions and removals (essentially default values from the IPCC good practice guidance for LULUCF). However, the information provided in the NIR for the AD comes from several sources and their relation with the CRF data is not always consistent. Estonia does not provide in the NIR transparent information on the choice of AD. The ERT recommends that Estonia clearly present the AD used in the NIR, and that the data be used consistently throughout the inventory. Additionally, the ERT reinforces the recommendation from the previous review report that Estonia provide supporting evidence to demonstrate that all forest land is managed.

82. Recalculations have been performed as a result of: improvements in the AD for forest biomass harvested; a new approach for estimating losses of fruit trees and inclusion of emissions from liming of agricultural land; the introduction of emissions from mineral and organic soils in grassland; updated AD for peat extraction; the reallocation of bushes from forest land to grassland. The recalculations resulted in a decrease in removals of 1.4 per cent for 1990 and an increase in removals of 19.8 per cent for 2007. The ERT recognizes the efforts of Estonia to improve its AD, but recommends that Estonia provide explanations for the changes in the trend introduced by the recalculations, because several recalculations are expected for the upcoming inventories. During the review, Estonia resubmitted revised estimates for forest land as a result of updated data for organic soil, which reduced the 2008 removals from forest land by 16.02 Gg CO_2 eq. The ERT recommends that the Party include the revised data with the relevant background documentation and explanations on the recalculations in the next annual submission.

83. Most of the sectoral recommendations of previous ERTs have not been implemented. However, Estonia indicated that it is developing an improvement programme with the aim of establishing closer cooperation between research institutions, and indicated that additional clarification would be provided in the next NIR. The ERT reinforces the previous recommendations and also recommends that Estonia include the work programme and planned improvements in its next annual submission, to improve transparency and follow-up of the planned activities.

2. Key categories

Forest land remaining forest land – CO_2

84. To estimate the carbon gains in biomass Estonia uses default data (tier 1) from the IPCC good practice guidance for LULUCF and the area of forest land as reported to the FAO. This forest land area, as reported in CRF table 5.A is, on average, approximately 5.7 per cent larger than that reported by the ESO for the period 1990–2008. This difference is likely to be due to the different definitions and associated parameters (e.g. minimum height of trees).

85. Estonia estimates the loss in biomass using data on the forest biomass harvested from the NFI for the years 1999–2008, while for the years prior to 1999 forest harvest data collected by the ESO are used. Estonia applies a fixed factor of 30.0 per cent to extrapolate the ESO data to make it consistent with the NFI data. However, the ERT notes that, for the period 1999–2003, the NFI data are consistently higher than the ESO values (60.3 per cent on average), and the extrapolation factor used could underestimate the volume harvested for the period from 1990 to 1998. Estonia does not provide an explanation for how the

extrapolation factor was developed, nor has it improved the transparency on the data sources, as encouraged by previous ERTs. The ERT reiterates previous recommendations that the Party improve the transparency of its inventory by providing more detailed information on the data sources and the rationale for the extrapolation factor used.

86. The ERT also noted that the annual area harvested according to NFI data was reduced by 32.9 per cent in the period 1999–2007, whereas the corresponding ESO data decreased by 10.5 per cent. The annual net rate of change of the NFI and ESO felling outturn are –8.8 per cent and 1.6 per cent respectively, indicating that the two sources of data provide very different results. The ERT recommends that Estonia provide reasons for the changes in the harvesting rate in its next annual submission for both data sources and the rationale for the choice of the final data used in the national inventory.

87. Estonia estimates emissions from organic soils using ESO forest data and datasets from the European programme CORINE (Coordination of information on the environment) 1990 and 2000 maps. As the forest area reported by ESO is consistently smaller than that reported to FAO, the area under organic soils and the corresponding emissions could be underestimated. The ERT recommends that Estonia use the percentage of mineral and organic soils identified in the ESO data as a proxy to identify the area of organic soils for the FAO forest area used in the CRF tables. In addition, Estonia continues to use the default IPCC CO_2 EF (0.16 t C/ha/year) for drained organic soils in managed forests for boreal forests, which may not be suitable for Estonia, as indicated by the previous ERT. During the review, Estonia indicated that a country-specific EF is being developed and would be implemented in future submissions. The ERT reiterates the recommendations of the previous review reports that the EF be reviewed or replaced with country-specific data.

Cropland remaining cropland – CO_2

88. The 2008 cropland area in Estonia is 17.4 per cent smaller than that in 1990, primarily due to the abandonment of croplands. Estonia reports changes in biomass carbon stocks from orchards only. Data on orchard areas provided by ESO are combined with tier 1 EFs from the IPCC good practice guidance for LULUCF. As there have been only negligible changes in the area of orchards prior to 2005, Estonia assumes that there was no biomass loss in the period 1990–2005. However, no information to support this assumption is provided. The ERT notes that Estonia only reports emissions associated with changes in the area of orchards; however, as a proportion of the mature trees may be replaced rather than removed completely, the emissions may be underestimated. The ERT reiterates the previous review recommendation that the Party review the assumptions regarding biomass loss and document and justify any assumptions made.

89. Estonia does not report changes in the carbon stock in mineral soil but does estimate emissions from cultivated organic soils. The area of organic soils was interpolated based on CORINE maps, but no information is provided on how this interpolation was implemented. The ERT recommends that Estonia provide more information on how the area of cultivated organic soils was derived to increase the transparency of its reporting.

Land converted to grassland – CO_2

90. Estonia only estimates carbon stock changes in mineral soils for cropland converted to grassland for the period 1994–2008. The area increased by 146.5 per cent within the period. As already noted, the incompleteness of the time series indicates constraints to properly track land-use changes. The ERT recommends that Estonia improve considerably its AD and reinvestigate and justify the assumptions made in the estimates.

F. Waste

1. Sector overview

91. In 2008, emissions from the waste sector amounted to 680.16 Gg CO_2 eq, or 3.4 per cent of total GHG emissions. Since the base year, emissions have decreased by 13.5 per cent. The key drivers for the fall in emissions are an increase of aerobic treatment of wastewaters and, to a smaller extent, a reduction of unmanaged solid waste disposal sites (SWDS) due to the implementation of waste management policies and measures. Within the sector, 75.6 per cent of the emissions were from solid waste disposal on land, followed by 17.8 per cent from biological treatment of waste and 6.6 per cent from wastewater handling.

92. The inventory is complete in terms of gases and categories, with the exception of CH_4 from industrial wastewater. Estonia did not estimate N_2O emissions from industrial wastewater and sludge; however, default IPCC methods are not available for this subcategory. During the review, Estonia submitted estimates for CH_4 emissions from the treatment of industrial wastewaters for the entire time series. The ERT recommends that Estonia include a description of the AD and estimation methods used for estimating CH_4 from industrial wastewater handling in its next annual submission.

93. In response to previous review recommendations, Estonia improved the transparency of the NIR by providing information on the country's waste management policies and measures and waste management facilities, additional information on waste incineration facilities and allocation of emissions from incineration with energy recovery, as well as explanations of emission trends in the waste sector. However, the ERT would like to emphasize the need for further improvements to the descriptions of the rationale and underlying assumptions used for the choice of methodological approach, AD and EFs and the drivers of trends (e.g. include information provided to the ERT on the drivers for emissions trends in solid waste disposal on land).

94. Recalculations have been carried out for the entire time series as a result of the inclusion of CH_4 emissions from domestic and commercial wastewater treatments for the first time. The recalculations resulted in an increase in the sector's emissions in 1990 and 2007 by 1.2 per cent and 0.1 per cent, respectively. The recalculations were implemented in response to previous review recommendations. The ERT notes that the recalculations were not described in the NIR. The ERT recommends that Estonia ensure that future recalculations are reported and explained in both the sectoral chapters and chapter 10 of the NIR as well as in CRF table 8(b). The revised estimates submitted by the Party during the review (para. 100) added 5.34 Gg CO_2 eq (or 0.8 per cent) to the total emissions from the sector in 2008.

95. As described above, Estonia has implemented a number of the recommendations from previous review reports. Recommendations that are outstanding from previous review reports are reiterated in the relevant category-specific sections of this report. The ERT notes that the NIR indicates that Estonia plans to address outstanding ERT recommendations in future submissions, including: corrections to historical AD on solid waste generated and the production output of industrial wastewater handling; use of more appropriate waste composition data for Estonian national circumstances; and the inclusion of a trend assessment for industrial wastewater handling emissions.

2. Key categories

Solid waste disposal on land – CH_4

96. Estonia used the first order decay method (tier 2) for the estimation of CH_4 emissions from SWDS using country-specific AD, waste composition data from the Netherlands and default IPCC values from the IPCC good practice guidance and the 2006 IPCC Guidelines for other parameters for the model. Historical data on the amounts of municipal solid waste generated in the period 1940–1989 were derived using the 'Forecast' function of the Excel software based on the amounts in the period 1990–2007, while data for 1990 and 1991 were extrapolated based on 1992–1998. The previous ERT observed that, as the amount of waste disposed to land has been declining, the 'Forecast' approach leads to an artificial reduction in the rate of waste generation in the period 1940–1989. It was also noted that the approach used resulted in very high waste generation rates for 1940 (415 kg/person). The ERT reiterates the previous recommendation that the Party revise the waste generation rate for the entire time series in order to reflect actual economic growth and consumption patterns in Estonia since 1940. The ERT also recommends that Estonia clearly document the methods used to extrapolate and interpolate data and to explain how time-series consistency has been maintained.

97. Due to a lack of data on waste composition, degradable organic carbon (DOC) values for the period 1940–2000 were calculated on the basis of analyses of waste composition in the Netherlands. The NIR provide no information to justify why these data would reflect conditions in Estonia. The NIR states that revised data on waste composition will be provided in the next annual submission. The ERT recommends that Estonia include a detailed description of the source of these new data and document any recalculations in the next annual submission. The ERT also encourages Estonia to implement QC checks on these new data, for instance undertaking comparisons with waste composition data from neighbouring Baltic countries.

98. Estonia has set the MCF value to 1.0 and the oxidation factor to 0 for the entire period, which implies that all SWDS are categorized as managed. The rationale for this assumption is not provided in the NIR. Estonia informed the ERT that no research or investigation has been made to classify SWDS in different IPCC categories, so all SWDS were categorized as managed by default. The ERT reiterates the recommendations from the previous review report that Estonia justify or change the assumption that all SWDS are managed for the entire time series and to modify the values for DOC and the MCF accordingly.

Wastewater handling – CH_4

99. The IPCC default method (tier 1) was used to estimate CH_4 emissions from municipal and commercial wastewater handling. AD were collected by the EEIC Water Bureau, while the EF was estimated by using a combination of IPCC default values and country-specific information on the type of wastewater treatment. Most of the wastewater in Estonia is treated in three centralized wastewater treatment facilities (at Tallin, Parnu and Narva). Most industrial wastewater is released into the domestic wastewater sewer system. Sludge which is produced is anaerobically treated (with biogas utilization), dehydrated and sent to either SWDS or biological treatment facilities (composting), or applied on soils. The amount of sludge applied to soils is reported in the agriculture sector. Emissions from domestic and industrial sludge which is disposed of on landfills are accounted for in solid waste disposal on land.

100. The ERT noted that CH_4 emissions from industrial wastewaters were reported as "NO" in the CRF tables, while in the NIR estimates were provided for the period 1995–2008. During the review, Estonia submitted estimates for the entire time series, which

resulted in an increase in emissions of 5.34 Gg CO_2 eq (or 0.8 per cent). The ERT recommends that Estonia report detailed information on the methods and parameters used to estimate the emissions in its next annual submission.

Waste incineration – N_2O

101. The tier 1 methods from the 2006 IPCC Guidelines were used to estimate emissions from waste incineration. During 2008 there was no waste incineration without energy recovery in Estonia. Emissions from waste incineration plants with energy recovery were reported in the energy sector in accordance with the Revised 1996 IPCC Guidelines. The ERT recommends that Estonia replace the AD notation key in CRF table 6.C with the AD used and report relevant emissions as included elsewhere ("IE") with the relevant explanation added to the notation key. The ERT also reiterates the recommendation of the previous review report that the Party provide information on hazardous waste incineration.

3. Non-key categories

Wastewater handling – N_2O

102. N_2O emissions from human sewage were estimated on the basis of per capita protein consumption from the FAO database. There is an inconsistency in the emission trend when the periods 1990–2003 and 2004–2008 are compared. The ERT reiterates the recommendation from the previous ERT that Estonia investigate the country-specific protein consumption and document its findings in its next annual submission.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

103. Estonia provided information relating to KP-LULUCF following the structure of the annotated NIR, providing general, land-specific and activity-specific information in line with the requirements of the annex to decision 15/CMP.1.

104. The Party reported activities under Article 3, paragraph 3, of the Kyoto Protocol and did not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol. Estonia has elected to account for the KP-LULUCF activities at the end of commitment period. The forest definition chosen by the Party is a minimum land area of 0.5 ha; minimum tree crown cover of 30 per cent; and minimum tree height of 2 metres.

105. Estonia uses a statistical approach to estimate the total area of afforestation, reforestation and deforestation (ARD) units following reporting method 1 of the IPCC good practice guidance for LULUCF. The spatial assessment unit for reporting ARD defined by Estonia is its national territory, therefore there is a need to demonstrate that this approach will provide the data at the scale necessary to identify lands units of ARD. However, the NIR does not provide clear information on the sampling scheme used, including sampling design, density of sampling and confidence level adopted. The ERT recommends that Estonia complement the NFI data with data from other sources, even if only to identify the uncertainties related to the identification of ARD via the NFI and the ongoing field work and to confirm the adequacy of the NFI to identify land areas under Articles 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT strongly recommends that, in its next annual submission, Estonia elaborate on the methodology used for identifying lands and provide

information to demonstrate complete land coverage on ARD in accordance with the requirements of paragraph 20 of the annex to decision 16/CMP.1.

106. Regarding activity-related information, Estonia uses a tier 1 approach to estimate carbon stock changes related to ARD activities and for organic soil. Estonia does not report on dead organic matter and assumes that carbon stocks in mineral soils do not change, regardless of changes in forest management, types and disturbance regimes. The ERT recommends that Estonia provide data on these omitted pools, or otherwise provide sufficient verifiable information, as required in paragraph 6(e) of the annex to decision 15/CMP.1, which demonstrates that these pools are not a net source. The Party informed the ERT that ongoing research is being carried out to estimate emissions/removals from the omitted carbon pools. The ERT commends the Party for its efforts and recommends that, as an interim approach, Estonia use data from countries with similar circumstances and conditions.

107. There is no specific uncertainty analysis or QA/QC procedure applied for the KP-LULUCF activities. The ERT recommends that Estonia implement such measures in its next annual submission.

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO_2

108. ESO provides the AD for afforestation and reforestation since 1990 separately, differentiating afforestation of quarries, agricultural land and other areas, and reforestation by sowing, planting, or assisted natural forest renewal. Estonia does not include abandoned cropland areas as afforested/reforested, because natural regeneration in those lands is not considered to be directly human-induced. Estonia applied an annual volume growth of 2.2 m^3/ha/year, but did not provide the values used for biomass expansion factor, density and root-to-shoot ratio to convert to biomass. The ERT recommends that the Party provide this information in its next annual submission.

109. Due to a lack of information about the ESO data, the ERT was not able to assess its appropriateness for the purposes of reporting under the Kyoto Protocol. ESO data on forests were collected according to the definition of forest under the Estonian Forest Act. This definition is inconsistent with the forest definition parameters chosen by Estonia for reporting under the Kyoto Protocol, because the forest parameters include a minimum area of 0.1 ha and minimum tree height of 1.3 m. If this is the case, the area under ARD activities may be overestimated. The ERT recommends that Estonia provide information to demonstrate the appropriateness of ESO data and their consistency with the forest definition parameters as chosen by the Party under the Kyoto Protocol for afforestation and reforestation activities.

Deforestation – CO_2

110. Data for deforestation for the period 1990–1999 are based on an analysis of satellite imagery, undertaken through a twinning project with Finland. From 1999 to 2008, the data are from the NFI, which was first implemented in Estonia in 1999. The different methodologies result in an obvious inconsistency in the time series, with the annual area deforested remaining constant at 6,404 kha for the period 1990–1999 and at 1,980 kha for the period 2000–2008. Estonia acknowledges this problem and has indicated that an improvement programme will be developed in order to collect data on land-use change to identify areas converted from forest to non-forest land. The ERT recommends that Estonia develop adequate data on land-use change to correctly identify areas converted from forest to non-forest land for reporting deforestation.

111. Estonia has not provided a clear explanation on how harvesting or forest disturbance that is followed by re-establishment of forest is distinguished from deforestation (paragraph 8(b) of the annex to decision 15/CMP.1). The ERT recommends that the Party provide more objective information on how the NFI team identifies forest areas that are temporarily destocked from non-forest land and how they assess the area of forest land converted to another land category, if this occurs. In response to a question raised by the ERT, Estonia provided additional information on the issue, and the ERT recommends that this information be included in the next annual submission.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

112. Estonia has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings included in the SIAR on the SEF tables and the SEF comparison report.[8] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings contained in the SIAR.

113. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with chapter I.E of the annex to decision 15/CMP.1, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements set out in paragraph 88 (a–j) of the annex to decision 22/CMP.1. The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred.

National registry

114. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place.

Calculation of the commitment period reserve

115. Estonia has reported its commitment period reserve in its 2010 annual submission. The Party reported its commitment period reserve to be 101,267,900 t CO_2 eq based on the national emissions in its most recently reviewed inventory (20,253.58 Gg CO_2 eq). The ERT disagreed with this figure. After the in-country review, in response to questions raised by the ERT, Estonia revised the estimates in its most recently reviewed inventory (2008) to be 20,271.00 Gg CO_2 eq and reported its calculation of the commitment period reserve to be 101,355,000 t CO_2 eq based on the national emissions in its most recently reviewed inventory (20,271.00 Gg CO_2 eq). The ERT agrees with this figure.

[8] The SEF comparison report is prepared by the ITL administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

3. Changes to the national system

116. Estonia reported in the NIR that there are changes in its national system since the previous annual submission. Since the previous submission, the agency responsible for inventory data in the waste sector has changed. EERC is now the responsible agency. During the review, in response to questions raised by the ERT, Estonia informed the ERT about additional changes to the national system, namely moving the former tasks of the EEIC to a new department within the MoE (the Climate and Radiation Department). Furthermore, Estonia plans to improve efficiency in inventory planning and to facilitate coordination between sectoral experts by contracting an external coordinator for the GHG inventory. The ERT concluded that, taking into account the confirmed changes in the national system, Estonia's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1 and that the changes help to strengthen the national system. The ERT recommends that the Party report in its next annual submission all changes in its national system in accordance with chapter I.F of the annex to decision 15/CMP.1.

4. Changes to the national registry

117. Estonia provided information in the NIR on changes in its national registry since the previous annual submission related to the change of the software used from GRETA to CR. The Party reported adequately on changes to the software and database structure, on conformity with technical standards and measures to minimize discrepancies and on the test plan related to software migration. The ERT concluded that, taking into account the confirmed changes in the national registry, the Party's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

118. Estonia has reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1, in its 2010 annual submission.

119. The ERT concluded that the information provided is complete and transparent.

120. Estonia reports on the considerations related to the implementation of the commitments related to Article 3, paragraph 14 in the context of the European Union directive on the promotion of the use of renewable energy (directive 2009/28/EC) and the European Union directive concerning the extension of the EU ETS to the aviation sector (directive 2008/101/EC), because these have been identified as having potential impacts on third countries. In addition, Estonia reported on cooperation projects with developing countries. Even though it is not a mandatory requirement for Estonia, the Party included a section with information on prioritizing the implementation of the commitments under Article 3, paragraph 14, to the actions enumerated in paragraph 24(a)–(f) of the annex to decision 15/CMP.1.

III. Conclusions and recommendations

121. Estonia made its annual submission on 15 April 2010 and resubmitted the CRF tables on 29 October 2010. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7,

paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes to the national system and the national registry and minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

122. The ERT concludes that the inventory submission of Estonia has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and the Party has submitted a complete set of CRF tables for the years 1990–2008 and an NIR; these are generally complete in terms of geographical coverage, years, sectors, categories and gases. The following industrial processes and waste sector categories were reported as "NE": CO_2 from limestone and dolomite use and CH_4 from industrial wastewater. However, during the review Estonia submitted complete time series for these missing estimates. In the LULUCF sector, the land conversion subcategories were all reported as "NE" (with the exception of cropland converted to grassland) as were the following pools: dead organic matter for forest land, cropland and grassland; mineral soils for cropland and grassland (except for cropland converted to grassland); and biomass for grassland.

123. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1.

124. The Party's inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF with minor exceptions, e.g. subtracting fuels used for industrial processes and other non-energy purposes from the fuel consumption reported for the reference approach (see para. 44).

125. Estonia has elected to account for Article 3, paragraph 3 activities at the end of the commitment period. The Party generally follows the requirements of paragraphs 5–9 of the annex to decision 15/CMP.1. However, some issues were identified, relating to the identification of land areas and the provision of verifiable information demonstrating that the litter and organic soil pools are not net sources. The KP-LULUCF inventory has generally been prepared in line with the IPCC good practice guidance for LULUCF and with the use of reporting method 1. However, the ERT notes that there is a need to demonstrate that this approach will provide the data at the scale necessary to identify lands units of ARD.

126. Estonia has reported information on its accounting of Kyoto Protocol units in accordance with chapter I.E of the annex to decision 15/CMP.1, and used the required reporting format tables as required by decision 14/CMP.1.

127. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1.

128. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

129. Estonia has reported the information requested in chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2010 annual submission. The information was provided on 15 April 2010. The reported information is considered complete and transparent. The ERT commends the Party for providing information on prioritizing the implementation of the commitments under Article 3, paragraph 14, to the actions enumerated in paragraph 24(a)–(f) of the annex to decision 15/CMP.1.

130. In the course of the review, the ERT formulated a number of recommendations relating to the methodologies, KP-LULUCF reporting, completeness and transparency of

the information presented in Estonia's annual submission. The key recommendations are that Estonia:

(a) Further improve and strengthen the national system, in particular with respect to the LULUCF sector and KP-LULUCF activities, and report on the progress in the next annual submission;

(b) Provide further information which demonstrates that the national system is able to identify areas of land subject to Article 3, paragraph 3 activities in accordance with the requirements of paragraph 20 of the annex to decision 16/CMP.1;

(c) Provide sufficient verifiable information, as required in paragraph 6(e) of the annex to decision 15/CMP.1, to demonstrate that any omitted pools are not a net source of emissions, or to include the estimates, as appropriate;

(d) Further elaborate the methodology and data used to estimate emissions/removals from KP-LULUCF activities, including planned improvements;

(e) Improve the completeness of the LULUCF sector estimates by reporting all mandatory categories and subcategories (e.g. land conversions);

(f) Harmonize the different sources of data, particularly for forest area, area harvested and area under organic soil, demonstrating their appropriateness for use in national inventories, when collected using different definitions and for different purposes;

(g) Conduct an uncertainty analysis for KP-LULUCF activities;

(h) Use the key category analysis and uncertainty analysis results as a basis for prioritizing inventory improvements;

(i) Improve QC checks of the CRF tables and the NIR prior to submission, to ensure that accurate and consistent data are presented and that the appropriate notation keys are used;

(j) Report on the implementation of the quality management system and develop a more specific QA/QC procedure for key categories;

(k) Further improve the transparency of the NIR by improving the explanation/justification of recalculations, trends, EFs and parameter selection;

(l) Improve reporting of the reference approach;

(m) Address the outstanding recommendations of previous reviews.

IV. Questions of implementation

131. No questions of implementation were identified by the ERT during the review.

Annex I

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>.

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/SBSTA/2006/9. Available at <http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>.

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"Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol". Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf# page=14>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

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UNFCCC. *Standard Independent Assessment Report*, Parts I and II. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Anne Mändmets (Ministry of Environment), including additional material on the methodology and assumptions used.

Annex II

Acronyms and abbreviations

AD	activity data
CH_4	methane
CKD	cement kiln dust
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
EU	European Union
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1,000 grams)
LULUCF	land use, land-use change and forestry
m^3	cubic metre
NA	not applicable
N_2O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change